

ABSTRACT OF THE DISCLOSURE

A system and methods for generating a variable rate filtered output using synchronous filters having the same filter sampling time, that avoids complexities of asynchronous filters. A system employs multiple filters that are staggered in time and 5 set so that the output of one of the multiple filters is available whenever a secondary process requires state information. In another embodiment, the synchronous filters are programmable so as to change the filter sampling time. This configuration is possible when it is known that the prescribed time interval of the secondary process is longer than the filter sampling time and the prescribed time interval is an integer 10 multiple of the filter sampling time. By using programmable filters, the number of filters required to accommodate a certain prescribed time interval can be minimized. Whether a system employs multiple non-programmable filters staggered in time or programmable filters, the invention achieves producing a variable rate filtered output while using synchronous filters. Thus, computationally intensive and complicated 15 variable rate filters can be avoided while minimizing processor requirements. In another aspect of the invention, the inventive method of generating a variable rate filtered output is employed in a lithography system to control the movements of various components therein. In one embodiment, the filtered outputs are used to estimate the relative positions of the reticle and the wafer. With the variable rate 20 feature, the lithography system can dynamically accommodate for the noise arising from component movements and other sources in the wafer exposure process.

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